

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)


Applicant's or agent's file reference 800186WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/FI 03/00575	International filing date (day/month/year) 18.07.2003	Priority date (day/month/year) 26.07.2002
International Patent Classification (IPC) or both national classification and IPC H01L31/01		
Applicant DETECTION TECHNOLOGY OY et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607, of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 12.02.2004	Date of completion of this report 15.10.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Kusztelan, L Telephone No. +49 89 2399-2479



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/FI 03/00575**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-13 as originally filed

Claims, Numbers

1-39 received on 27.09.2004 with letter of 27.09.2004

Drawings, Sheets

1-8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-35
	No: Claims	
Inventive step (IS)	Yes: Claims	1-35
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-35
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/FI 03/00575

1. Reference is made to the following documents:

- D1: PATENT ABSTRACTS OF JAPAN vol. 1999, no. 14, 22 December 1999 (1999-12-22) & JP 11 261086 A (SHARP CORP), 24 September 1999
- D2: WO 98 54554 A (HILSUM CYRIL ;SECR DEFENCE (GB); WATTON REX (GB)) 3 December 1998 (1998-12-03)
- D3: US-A-5 599 744 (MCCAUSLAND CONNIE S ET AL) 4 February 1997
- D4: US-B1-6 173 031 (KOTIAN FRANCOIS ET AL) 9 January 2001
- D5: US-B1-6 396 898 (SAITO YASUO ET AL) 28 May 2002 (2002-05-28)

2. The Application does not meet the Requirements of Art.6 PCT because claims 1 & 20 are not clear.

2.1 The claims 1 & 20 feature "cathode on a second surface of the substrate" concerns a means of operating the device which thus does correspond to an unambiguously defined device feature. Moreover, support for the generalised cathode feature, not comprising an active area on the second surface of the substrate, cf. claim 13 as originally filed, essential to the invention since it provides a solution to the problem of the limitation on the size of photodetector arrays, cf. description pg.2, could not be located Art.6 as well as Art.34(2)(b) PCT.

2.2 The claims 1 & 20 feature "array of photodetectors for computed tomography" is unclear since it is not apparent if protection is sought only for the photodetector array as such (suitable for uses such as computed tomography) or if protection is sought for an array of photodiodes of a computed tomography system. Moreover, the available support for the first option could not be located, cf. claims 1,18-20 as originally filed, Art.6 as well as Art.34(2)(b) PCT.

3. Interpreting the claims with the aid of the description, cf. objections of Section 2 above, attention is drawn to the following:

3.1 D1, cf. Abs. & Fig.3 concerns a via connected photodiode array with active area connections on the substrate lower surface, used in a battery. There is no disclosure for an array of photodiodes of a computed tomography system

3.2 D2, cf. Abs.fig. concerns a photodetector array with one electrode via connected through an underlying substrate. There is no disclosure of a substrate with active regions on upper & lower surfaces.

**INTERNATIONAL PRELIMINARY
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- 3.3 D3, cf. Figs.1-6 & text discloses via substrates for photodetectors. There is no disclosure of a substrate with active regions on upper & lower surfaces.
- 3.4 D4, cf. fig.4 & text & D5, cf. fig.20 disclose photodiode arrays in CT systems. There are no details of the photodetector array devices.

The claimed subject-matter is therefore new. D1 is closest prior art however does not point to an array of such photodiodes of a computed tomography system. Consequently an inventive nature of claim 1 & corresponding method claim 20 is appreciated.

REPLACED BY
ART 34 CLAIMS

1. A substrate including a semiconductor device having an active area on one surface of the substrate, wherein there is provided a conductive via from the one surface of the substrate to the other surface of the substrate for connecting the active area to the other surface of the substrate.
2. A substrate according to claim 1 wherein the conductive via is electrically isolated from the substrate.
3. A substrate according to claim 1 or claim 2 wherein the conductive via comprises polysilicon.
4. A substrate according to claim 3 wherein the polysilicon is formed on the inner walls of the via.
5. A substrate according to claim 4 wherein there is provided a further conductive element from one side of the substrate to the other within the conductive via.
6. A substrate according to claim 4 wherein there is provided a filling material within the conductive via.
7. A substrate according to any one of claims 1 to 6 wherein there is provided a further conductive element connected between the active area of the device and the conductive via.
8. A substrate according to any one of claims 1 to 7 wherein there is provided a further conductive element on the other side of the substrate connected to the conductive via.
9. A substrate according to claim 8 wherein the further conductive element on the other side of the substrate is for making an off-chip connection to the conductive via.
10. A substrate according to any one of claims 1 to 9 wherein the semiconductor device is a photodiode.
11. A substrate according to claim 10 wherein the active area on the one surface of the device is an anode.
12. A substrate according to any one of claims 1 to 11 wherein the semiconductor device includes a further active area on the other side of the substrate.